



A.D. 1802 N 2572.

S P E C I F I C A T I O N

OF

JOSEPH LEWIS.

FURNACES OF STEAM BOILERS.

L O N D O N :

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Furnaces of Steam Boilers.

LEWIS' SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JOSEPH LEWIS, of Brimscomb, in the County of Gloucester, Dyer, do send greeting.

WHEREAS His most Excellent Majesty King George the Third, by His Letters Patent under the Great Seal of the United Kingdom of Great Britain and
5 Ireland, bearing date at Westminster, the Sixteenth day of January, in the forty-second year of His reign, did give and grant unto me, the said Joseph Lewis, my executors, administrators, and assigns, His special licence, full power, sole privilege and authority, that I, the said Joseph Lewis, my executors, administrators, and assigns, during the term of years therein expressed, should and
10 lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick upon Tweed, my Invention of "CERTAIN IMPROVEMENTS IN THE ART OF DYING BY MEANS OF A NEW METHOD OF COOLING THE CLOTH AND OTHER PIECE GOODS (PARTICULARLY IN DYING BLACK), AND A NEW MODE OF APPLYING THE FIRE FOR THE PURPOSE OF HEATING THE BOILER OR OTHER VESSELS, AND WHICH MAY BE ALSO
15 APPLIED TO THE HEATING OF OTHER BOILERS OR VESSELS WHERE HEAT IS REQUIRED;" in which Letters Patent there is contained a proviso obliging me, the said Joseph Lewis, under my hand and seal, to cause a particular description of the nature of my said Invention, and in what manner the same is to be performed, to be inrolled in His Majesty's High Court of Chancery within one calendar
20 month next and immediately after the date of the said in part recited Letters Patent, as in and by the same, relation being thereunto had, may more fully large appear.

Lewis' Improvements in Dyeing, &c.

NOW KNOW YE, that in compliance with the said proviso, I, the said Joseph Lewis, do hereby describe and ascertain the nature of my said Invention, and declare, first, that my new method of cooling cloth and other piece goods consists in passing the cloth from the boiler over cylinders or rollers erected on a stage adjoining or near to the boiler, and is performed in the following manner:— 5

Immediately opposite the roller over which the cloth turns in the boiler a stage is erected of a proper width for the goods intended to be dyed. This stage is so high that when covered with lead, tiles, or any other material, the gutters which are placed under the eaves may be sufficiently elevated to convey the liquor which drops from the cloth while turned over it back again into the boiler. 10 At each end of the stage is a trough of dimensions sufficient to contain the whole of the goods intended to be dyed at one time, and which troughs must discharge the liquor which runs from the cloth into them into the said gutters. The trough nearest the dye-house may be placed so near the wall as to prevent the liquor from dropping between it and the wall. At each end of the stage a 15 roller with a winch or handle is placed so high above the troughs as to admit of the troughs holding the whole of the goods easily, and between the said rollers with winches or handles other intermediate rollers extend over the width of the said stage at about three feet distance from each other. The rollers with winches or handles are about thirty inches diameter, and it will be better if the inter- 20 mediate rollers approach nearly to the same size, as in proportion to their size the cloth is more easily and expeditiously wound from one extremity of the stage to the other; though rollers so small as to be only about four inches diameter may be used where the stage is but short, though with manifest disadvantage. An opening is made through the wall of the dye-house between the roller over 25 the boiler and the stage, and a small roller is placed in that opening to prevent the cloth from dragging on the wall, and another small roller (which may be removed at pleasure) between the roller over the boiler and the wall. A cord is tyed or fastened to the roller with a winch at the extremity of the stage opposite the dye-house sufficiently long to reach to the roller above the boiler; it 30 is fastened by a noose to the goods, which are then wound over the roller at the end of the stage nearest to the boiler, and likewise over all the intermediate rollers till it comes to the roller round which, by turning, the cord is wound. The noose is then slipped and the end tyed to the said roller. The goods are then wound on into the trough under that roller till the whole is out of the boiler; 35 they are then wound back into the trough at the other end of the stage, and so on backwards and forwards till the cloth is cool. N.B.—A sloping board or frame of boards is placed between the wall of the dye-house and the boiler to save the liquor; but this as well as the small roller placed in the same situation

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must be moveable to allow the workmen room to keep the cloth abroad while turning in the boiler. A moveable gutter or gutters are likewise placed between the wall and the boiler to convey the liquor which runs from those under the eaves into the boiler. Three workmen are employed in dying; one of these is
5 placed when the goods are cooled at each winch on the stage, and the other keeps the cloth abroad while coming out of the boiler. It is universally allowed that repeated cooling is essential in the dying of black. To accomplish this effectually and expeditiously, and likewise to secure the cloth from the possibility of being heat wrinkled, is the object of this part of the Invention. Secondly,
10 my mode of applying the fire for the purpose of heating the boiler is founded on the idea that the stronger the draught (that is, the greater the quantity of air that can be made to pass through the fire), the greater will be the effect of the fire on the liquor, provided the heat so generated impinges in the best possible direction against the boiler. To gain this advantage I place a grate exactly
15 under the center of the boiler proportioned to its size and the expedition with which it is required to boil. Brickwork is raised about eight inches round the grate to contain the fuel, and a distance of about four inches is left between the flat brickwork and that part of the bottom of the boiler which is larger than the grate. The boiler is supported by three half bricks forming a triangle on the
20 flat brickwork, giving a distance of about twelve inches from the grate to the bottom of the boiler. The whole of the sides of the boiler are likewise set four inches at bottom and three inches at top from the brickwork which surrounds it up to the closing, which closing is seven or eight inches below the top of the boiler. At the closing are four flues at equal distances, taking at their entrance
25 the form of the boiler, which (to induce the flame to spread) are there thirty inches by about three inches in a boiler intended for dying, and which is about six feet diameter at top, and as they rise gradually become less than thirty inches and more than three, till they come each of them to a square flue, or rather chimney, of about eight inches diameter, through which the smoke issues; or
30 two of them may be brought into one at a convenient height (say, about six feet above the boiler). It may here be observed that the flues or chimneys should rise immediately from the boiler as perpendicularly as possible; that is, the thirty inches should be reduced as gradually as the necessity of allowing sufficient room for the cloth to pass between the chimney to the cooling apparatus
35 will permit; but where the boiler is not intended for dying, or the nature of its use will permit, the flues may be more than thirty inches at their opening, the more the better, and should rise as perpendicularly as convenient. The number of flues or chimneys is immaterial, provided they are so disposed as to cause an equal distribution of heat round the boiler. It is very essential that these flues

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or chimneys should be exactly of a size or they will draw unequally. Where the apparatus for cooling is not used, there will be room for the dyer to throw the cloth from the roller notwithstanding the chimneys; but if the situation of the chimneys should prove inconvenient, an additional roller, made very slight, may be put up occasionally a small distance from the boiler, over which the cloth 5 may be conveyed and drop at once on the utensil used for carrying the cloth from the boiler. By the mode above described you have nearly a perpendicular draught, and the flame impinges with an astonishing force against the bottom of the boiler, (instead of being drawn horizontally upon the fire, as is the case where the flame passes into a flue immediately opposite the furnace door,) and as it 10 leaves the bottom clasps its sides. The whole of the boiler is thus exposed to the strongest possible draught and in the best possible direction, being completely enveloped in flame. The saving in fuel and (what is often of more consequence to the dyer) in time I have found to be from one-third to one-half over any other mode of the many I have tried. When the water is only required 15 to be heated, as in brewing, an arch forming a dome may be thrown over the boiler, and another boiler, somewhat wider in its dimensions, may be placed upon that arch, rather more distance being preserved between the brickwork and the boiler. In this case the flue or flues may at their opening nearly surround the lower boiler, and must not vary in their dimensions; but the flame and smoke 20 must pass from the upper boiler in the manner before described for the lower one, only the flues may be four or five inches wide where they leave the boiler.

In witness whereof, I, the said Joseph Lewis, have hereunto set my hand and seal, this Tenth day of February, in the year of our Lord One thousand eight hundred and two. 25

JOSEPH (L.S.) LEWIS.

W. W. PEPYS. **AND BE IT REMEMBERED**, that on the same Tenth day of February, in the year above mentioned, the aforesaid Joseph Lewis came before our Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and everything therein contained, in form above written. And also the Speci- 30 fication aforesaid was stamped according to the tenor of the Statute in that case made and provided.

Inrolled the same Tenth day of February, in the year above written.

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